Report To
Solid Waste Interim Steering Committee

Consolidation Of Existing Solid Waste Management Plans In The Greater Toronto Area

MacViro
MacViro Consultants Inc.

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14 August 1989

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Report to Solid Waste Interim Steering Committee (SWISC) on
Consolidation of Existing Solid Waste Management Plans

Dear Mr. Farrow:

We are pleased to provide this report on consolidating information on the solid waste management plans, programs and facilities of the municipalities within the Greater Toronto Area.

We have enjoyed this opportunity of being of service to you and we trust that this report will meet your requirements.

Yours very truly,

MacViro Consultants Inc.

D.O. Meriman, MBA, P.Eng.
Vice President

Encl.
/mc

Executive Summary

EXECUTIVE SUMMARY

The municipalities of the Greater Toronto Area (GTA), consisting of Metropolitan Toronto and the surrounding Regional Municipalities of Durham, York, Peel and Halton, will be implementing initiatives in the Solid Waste Management area. This report provides a consolidation of information on the solid waste management plans programs and facilities within the GTA.

In response to rising environmental concerns coupled with difficulties encountered in developing new solid waste disposal facilities, waste reduction, reuse and recycling (3 Rs) efforts are developing rapidly. Some of the measures currently implemented and under investigation include:

- Blue box curbside recycling programs for newspapers, glass, metal and PET soft drink containers
- Expanding recycling efforts to apartment buildings
- Expanding the number of materials collected through the blue box programs
- Improving recycling services in rural areas either via blue box programs or a network of depots
- Public education and promotion programs
- Promotion of home composting
- Separate collection and composting of garden wastes and leaves in the spring and fall
- Household hazardous waste programs
- Programs to recover cardboard from commercial and industrial generators (coupled with bans on cardboard at landfill sites)

- Programs to recover selected building materials coupled with material bans (e.g., wood and drywall)

- The recovery of various grades of paper from offices and institutions, and

- Programs to assist industries in reducing, reusing and recycling a wide variety of materials from their solid waste stream.

The solid wastes generated within the GTA are managed in a number of facilities including recycling centres, transfer stations and landfill sites. These facilities are illustrated in Figure 1.

The recycling centres process and market the materials collected by the blue box programs. The majority of the municipal waste collected in Metro Toronto is handled through a network of some 7 stations where it is transferred to large trailers for haul to the landfill sites. The balance of the wastes are hauled directly to landfill.

Within the Region of Peel, a 410 tonne per day, private sector Energy-from-Waste facility has recently been approved. Plans call for it to be constructed in the coming year.

The transfer stations in rural areas are generally located at old landfill sites and provide collection points for wastes to be hauled to the larger remaining landfill sites. These stations generally have containers for recyclables as well as solid wastes. Two transfer stations are located in Halton. These facilities are used extensively as all solid waste currently generated in Halton is exported to disposal facilities outside of the Region.

The three key landfill sites within the GTA are Metro Toronto's Brock West and Keele Valley sites plus Peel's Britannia site. In addition, the Brock West site serves a substantial portion of Durham Region while Keele Valley serves most of York Region.

The rural areas of Durham, York and Peel are served by a number of small local landfill sites. In addition to these existing facilities, a new landfill site in Milton, within the Region of Halton, has been approved subject to judicial review.

Current solid waste generation within the GTA is in the order of 4 million tonnes per year. Even with the extensive recent recycling efforts, the capacity of the existing three key landfill sites is rapidly running out. The estimated remaining capacity and projected closure dates for the three key landfill sites are as follows:

Facility	Estimated Remaining Capacity (as of January 1, 1989) (tonnes)	Projected Closure Date
Brock West	1,500,000	1990
Keele Valley	12,700,000	1992
Britannia	1,200,000	1990

Given this situation, there is a need for short term and contingency facilities, as well as a long term solution. The municipalities in the GTA will be identifying these short term and contingency facilities as well as working towards a long term solution.

Table Of Contents

TABLE OF CONTENTS

		Page
Letter of Transmittal		
Executive Summary		i
1.0	INTRODUCTION	1-1
2.0	EXISTING AND FUTURE PLANS	2-1
2.1	Durham	2-1
2.2	York	2-3
2.3	Metro	2-3
2.4	Peel	2-8
2.5	Halton	2-10
3.0	WASTE QUANTITIES	3-1
3.1	Generated Wastes	3-1
3.2	Waste Reduction, Reuse and Recycling	3-3
3.3	Quantities Requiring Disposal	3-4
4.0	WASTE REDUCTION, REUSE AND RECYCLING	4-1
4.1	Durham	4-3
4.2	York	4-4
4.3	Metro	4-6
4.4	Peel	4-12
4.5	Halton	4-14
5.0	EXISTING LANDFILLS	5-1
5.1	Durham	5-1
5.2	York	5-3
5.3	Metro	5-4
5.4	Peel	5-4
5.5	Halton	5-6
6.0	OTHER FACILITIES	6-1
6.1	Durham	6-1
6.2	York	6-1
6.3	Metro	6-1

TABLE OF CONTENTS (Cont'd)

			Page
	6.3.1	Disco	6-2
	6.3.2	Bermondsey	6-2
	6.3.3	Ingram	6-3
	6.3.4	Symes	6-3
	6.3.5	Victoria Park	6-3
	6.3.6	Scarborough	6-4
	6.3.7	Dufferin	6-4
	6.3.8	Private Sector Transfer Stations	6-5
6.4		Peel	6-5
6.5		Halton	6-6
	6.5.1	Norjohn Transfer Station	6-6
	6.5.2	Georgetown Transfer Station	6-6
	6.5.3	Container Stations	6-7
	6.5.4	Future EFW Facility	6-7
7.0		MANDATE AND ADMINISTRATIVE ISSUES	7-1
7.1		Durham	7-1
7.2		York	7-1
7.3		Metro	7-2
7.4		Peel	7-4
7.5		Halton	7-5

APPENDIX A - Glossary

APPENDIX B - List of Available Reports

Introduction

1.0 INTRODUCTION

The Municipality of Metropolitan Toronto, together with the Regional Municipalities of Durham, York, Peel and Halton are working together with the Province of Ontario to develop a program for the effective management of the solid wastes generated in the Greater Toronto Area (GTA). This program includes both short term contingency solutions and the development of a long term reliable solution for the management of solid wastes.

Each of the participating municipalities continues to work in developing plans, programs and new facilities for the management of their wastes. In addition there are a number of existing facilities with varying degrees of capacity operating within the GTA.

Given the above background, the two major objectives of this report are as follows:

- To compile, collate and summarize existing data, reports and master plans developed by the municipalities within the GTA; and

- To identify existing waste management facilities and alternatives; together with plans for reduction, reuse and recycling, and recovery mechanisms for diverting material from landfill.

An overview of this report illustrating how the above objectives are fulfilled is as follows.

Section 2 provides an identification of existing plans and their status together with an identification of future plans. The content of these plans is expanded upon in the subsequent sections.

Section 3 provides projections of the quantities of waste that will be generated by the participants. This also includes the quantities that will require disposal and those that are presently planned to be recycled or otherwise eliminated from the waste stream.

Section 4 describes the waste reduction, reuse and recycling targets, activities and plans within the five participating municipalities.

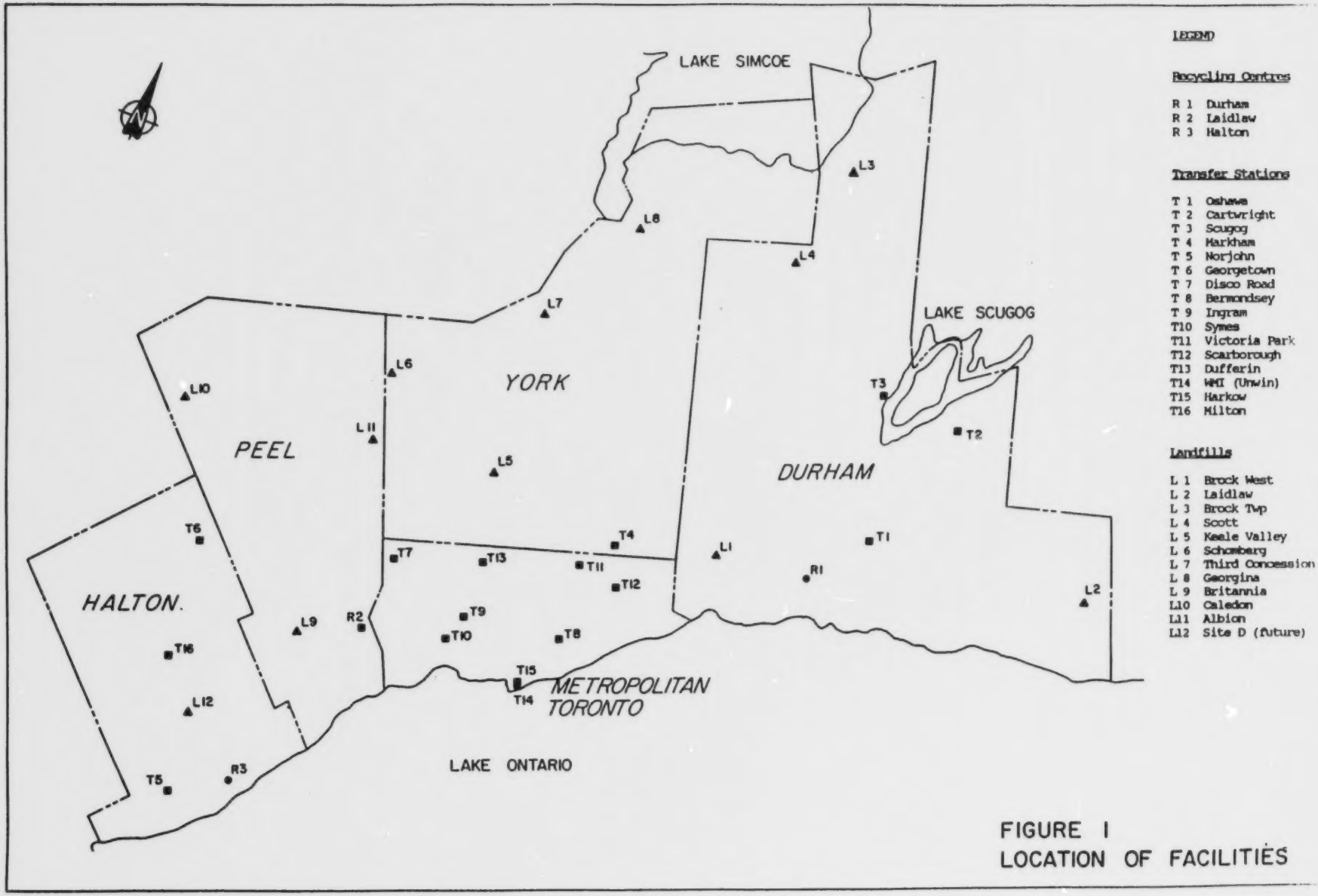
Section 5 provides information on the existing landfill facilities within the project area.

Other solid waste management facilities including transfer stations and a potential energy-from-waste facility are presented in Section 6.

Section 7 includes a consideration of the mandate, authority, responsibility and ownership of the waste materials generated within the various jurisdictions. The management organization structure employed within Metro and each of the five Regions is also discussed.

This report identifies the need for short term and contingency facilities. The municipalities in the GTA are presently in the process of identifying such facilities.

Appendix A provides a glossary of the terms used in this Report while Appendix B provides a listing of available reports that provide additional details on the topics discussed in this document.



LEGEND

Recycling Centres

R 1 Durham
R 2 Laidlaw
R 3 Halton

Transfer Stations

T 1 Oshawa
T 2 Cartwright
T 3 Scugog
T 4 Markham
T 5 Norjohn
T 6 Georgetown
T 7 Disco Road
T 8 Bermondsey
T 9 Ingram
T10 Symes
T11 Victoria Park
T12 Scarborough
T13 Dufferin
T14 WMI (Unwin)
T15 Harkow
T16 Milton

Landfills

L 1 Brock West
L 2 Laidlaw
L 3 Brock Twp
L 4 Scott
L 5 Keele Valley
L 6 Schomberg
L 7 Third Concession
L 8 Georgina
L 9 Britannia
L10 Caledon
L11 Albion
L12 Site D (future)

FIGURE I
LOCATION OF FACILITIES

Existing & Future Plans

2.0 EXISTING AND FUTURE PLANS

This chapter provides an overview of the various plans and documents that have been and are being produced by the municipalities in the Greater Toronto Area (GTA). The intent of this chapter is to provide readers with an understanding of the nature of the work completed to date and the activities that are presently ongoing. This chapter does not attempt to summarize the content of these documents as this is provided in the following sections that deal with the specific solid waste management topics.

2.1 Durham

Over the past few years the Regional Municipality of Durham has commissioned several studies to examine waste management alternatives. Until 1988 Durham participated with Metro Toronto in Solid Waste Environmental Assessment Plan (SWEAP), however, in October 1988 Regional Council decided to cease co-operation with Metro. In February of 1989 Regional Council decided to build upon earlier studies and develop a master plan for Durham Region's waste only. This plan, which will include the selection of sites for system components, is due to be completed in 1990.

The Waste Management Study (May 1985) addresses the following items:

- a description of the existing waste management system including costs;
- legislation and trends in waste management;
- alternative waste processing and disposal methods;
- evaluation criteria for components and options;
- market opportunities for recovered materials and energy-from-waste; and
- the evaluation of a number of options followed by a recommended strategy of continued co-operation with Metro.

The Waste Management Study Update Report (July 1988) builds upon the earlier study and addresses the following items:

- the existing waste management system including a set of waste quantity

projections
- a "beyond" curbside recycling program
- Energy-from-Waste issues
- landfill alternatives
- a set of long term strategies for waste management, and
- a recommended strategy of continued participation by Durham in SWEAP albeit in a more proactive role.

As indicated above, in October 1988, Durham decided to implement its own Solid Waste Master Plan.

The Region is implementing an aggressive waste reduction and recycling program aimed at reducing the total quantity of waste requiring disposal by 25 percent by 1992. The current Durham Region master plan undertaking includes an extensive public participation program.

The Master Planning Process that is currently underway is designed to build upon the earlier work and meet the requirements set out in the Environmental Assessment Act. The major components described in the workplan of December 1988 are:

- Public and Review Agency Participation Program
- Waste Processing/Energy-From-Waste Component
- Landfill Component
- Selection Criteria Component
- Environmental Analysis Component
- Reporting upon Waste Reduction, Recycling and Reuse Projects, and
- The monitoring of other proposals.

The master planning process, adopted by Durham, does not follow the usual 3-staged approach, rather the plans call for an Interim Report to be produced in the summer of 1989 and a Final Master Plan Document, including the selection of sites for both a landfill and waste processing facilities during 1990.

It is the intent of the Region of Durham to consider this plan as an alternative to a centralized option that may be provided to the municipalities within the GTA.

2.2 York

The Regional Municipality of York is an observer of the Metro SWEAP process.

In addition to monitoring SWEAP activities York has recently commissioned and received a report on waste management alternatives. The key items addressed in this report of May 1989 are as follows:

- Waste Quantities and the Existing Waste Management System
- Waste Reduction, Reuse and Recycling
- Energy-from-Waste
- Landfill, and
- Solid Waste Management Options.

The Region of York does not have nor is it currently in the process of developing its own Solid Waste Management Master Plan.

2.3 Metro

The Municipality of Metropolitan Toronto decided in March 1987 to undertake a study to update its Solid Waste Management Master Plan. This study, known as the Solid Waste Environmental Assessment Plan, or SWEAP, is organized into seven major components. These are:

1.0 Reduction and Recycling
2.0 Landfill Site Search
3.0 Technology Evaluation
4.0 Data Collection
5.0 Public Participation
6.0 Public Education
7.0 Master Plan Preparation

An extensive array of documents are being prepared within each of these components. In general, many of these documents are first issued as discussion papers. These papers may then be revised and reissued first as draft working papers and ultimately as working papers.

A listing of these reports as set out by the Commissioner of Works is as follows:

"Component 1.0 Reduction and Recycling

Discussion Paper No.	Discussion Paper Title	Status
1.1	Status Report on Solid Waste Reduction and Recycling,	Circulated for public and agency comment - December 1987.
1.2	A Waste Reduction Strategy for Metropolitan Toronto, January 1988.	Circulated for public and agency comment - December 1987.
1.3	A Regulatory Agenda for Waste Reduction, June 1989.	Circulated for public and agency comment - July 1989.
1.4	Metropolitan Toronto Reduction and Recycling Plan, "The First 5 Years"	Circulated for public and agency comment - July 1989.
1.5	Status Report on Solid Waste Reduction and Recycling, 1989.	Expected December 1989.

Reduction and Recycling initiatives have developed rapidly. The current Metro initiatives, described in the following Section 4.3, supercede many of the discussion papers listed above. Document 1.5, when published, will serve to describe the current status of activities.

Component 2.0 Landfill Site Search

Discussion Paper No.	Discussion Paper Title	Status
2.1	SWEAP Landfill Site Selection Process, December 1987. (A key document describing the area and outlining the selection process.)	Circulated for public and agency comment - December 1987. Recirculated as a draft working paper - July 1989.
2.2	Priority Area Identification. (This paper will document the priority area identification process within the candidate region.)	Expected Fall 1989.
2.3	Candidate Site Identification. (This paper will document the identification, through constraint mapping, of a long list of sites within the candidate region. The constraint maps will be included in this paper.)	Expected Winter 1990.
2.4	External Siting Opportunities. (This paper will document the analysis of external siting opportunities, i.e., voluntary host communities and willing landowners.)	Expected Winter 1991.
2.5	Screening and Analysis Sites. (This paper will document the screening of the long list of sites identified within the candidate region as well as willing landowners outside that area.)	Expected Spring 1990.
2.6	Comparative Evaluation of Candidate Sites and Selection of Preferred Site. (This paper will document the comparative evaluation of the short list of sites to identify a preferred landfill site(s).)	Expected Fall 1990.

2.7	Detailed Site Investigation and Environmental Assessment Documentation. (This paper will document the detailed site assessment of the preferred landfill site(s).)	Expected Fall 1991.

Component 3.0 Technology Evaluation

Discussion Paper No.	Discussion Paper Title	Status
3.1	Introduction to Solid Waste Management Approaches	Circulated for public and agency comment - December 1987.
3.2	Long Term Planning Analysis of Solid Waste Management System Options	Circulated for public and agency comment - December 1988.
3.3	Role of the Private Sector	Expected Fall 1989.
3.4	Market Evaluation for Recyclable Materials	Expected Fall 1989.
3.5	Site Selection for Non-landfill Solid Waste Management Approaches	Expected Fall 1989.
3.6	Assessment of Risks from Solid Waste Incineration in the Commissioners/Cherry Street Area of Toronto	Expected Winter 1989.

All of the above Discussion Papers provide (or will provide) details on the specific topics described in their respective titles.

Component 4.0 Data Collection

Discussion Paper No.	Discussion Paper Title	Status
4.1	Solid Waste Management System Inventory, Base Year 1986	Circulated for public and agency comment - February 1988.
4.2	Solid Waste Management System Inventory, 1987	Circulated for public and agency comment - February 1989.
4.3	Solid Waste Management System Inventory, 1988.	Expected Winter 1990.

Discussion Paper 4.1 provides a comprehensive description of the components and facilities that make up Metro's solid waste management system. The subsequent Discussion Papers provide updates to this base document with emphasis on revised quantity projections.

Component 5.0 Public Participation

Discussion Paper No.	Discussion Paper Title	Status
5.1	Development of the Public Participation Program, January 1988	Circulated for public and agency comment - January 1989.
5.2	Public Participation Program Phase 2: Establishment of the Core Program	Expected Winter 1990.

When published, Discussion Paper 5.2 will provide a key description of public participation activities.

Component 7.0 Master Plan Development

Discussion Paper No.	Discussion Paper Title	Status
7.1	Preliminary Solid Waste Management Master Plan	Expected Fall 1989."

The Preliminary Solid Waste Management Master Plan will provide a synthesis of the above studies, an updated set of waste quantity projections, and indicate a preferred direction for Metro.

Available information relevant for future planning on selected topics has been extracted from these documents and is summarized in following sections.

As part of Component 5 of the SWEAP process a number of public participation activities have been held in Durham, York and Metro. With the exception of landfill siting issues these have been fairly general items as the SWEAP process has been at an early stage thus far. As part of the process a broad range of stakeholders here have been identified and provided with the opportunity for involvement in the process.

2.4 Peel

The Regional Municipality of Peel has been involved in developing a Solid Waste Management Master Plan for some time. A Stage 1 report was issued in April 1984 and the Master Plan was completed in its current form with the Stage 3 Final Report and Master Plan of August 1988.

The Stage 1 report provided: a description of the existing system of the day; a set of waste quantity projections; a review of waste disposal alternatives; and the first stages of landfill site selection.

The Stage 2 Preliminary Report of January 1985 provided an identification and evaluation of a number of system alternatives.

The Stage 2 Final Report of March 1986 supplemented the preliminary report by providing additional technical details on a number of the waste management alternatives.

The Stage 3 Preliminary Report of December 1986 describes and evaluates the preferred Master Plan system. This report is supplemented by the Final Stage 3 Report of August 1988.

The preferred system is set out in point 5 of the Draft Solid Waste Management Policy Statement and Master Plan (1988).

> "The Solid Waste Management Master Plan is based on conservation. The Master Plan consists of three interdependent components in order of policy priority:
>
> (a) The first component is an aggressive set of waste reduction and recycling programs designed to minimize the amount of waste material requiring disposal by other means from both population and employment related sources.
>
> (b) The second component is the recovery of energy from the incinerable wastes that remain following the waste reduction and recycling programs.
>
> (c) The third component is the landfilling of non-processable wastes including acceptable residues from the first and second components."

In parallel with the Master Planning Process the Region of Peel has undertaken a landfill site search and identified a preferred site on Airport Road in Brampton.

An environmental assessment document together with supporting reports on this site, known as Site VI, has been prepared and submitted for review and comment. The government review of this draft Environmental Assessment (EA)

has taken place and concerns have been expressed regarding the site selection process. In the opinion of the Ministry of the Environment, these concerns, if not addressed, may lead to difficulties at an Environmental Assessment Act (EAA) hearing. The hearing on this site has therefore been delayed pending resolution of these matters.

Throughout the Peel Master Planning and landfill site selection process there has been an extensive public participation program which, along with Council decision-making, is documented in each of the Master Plan reports.

It is not intended to submit the entire Peel Master Plan to an Environmental Assessment rather the Region's strategy calls for Environmental Assessments to be held on the individual components with the Master Plan used as a supporting document.

During hearings the Master Plan serves as a background document used to establish the need for the undertaking and provide the analysis of the alternatives to the undertaking. This approach was used during the EA hearing for the Energy-from-Waste plant presently proposed by Peel Resource Recovery Inc. (proposed by SNC during the actual hearing) and will likely be used again at any future hearings on undertakings that affect Peel wastes.

The Stage 3 Preliminary Report was submitted to Regional Council in December of 1986. Although the final report of August 1988 has been received by Council it has not been adopted as yet. The overall policies of the Region with respect to Solid Waste Management are presented in the Draft Solid Waste Management Policy Statement and Master Plan of August 1988.

2.5 Halton

Approval is pending for a new landfill site in Milton for the Region. The development of additional waste diversion options to meet the commitments made at the landfill hearing to reduce the reliance on landfill are presently being explored. The plans and documents commissioned by the Region pertain to these specific undertakings for landfill, resource

recovery and recycling. Although the Region does not have a formal Master Plan, since the planning process predates the Ministry's funding program, the Region has generated much of the documentation normally included in a Waste Management Master Plan.

Although not formally set out in a Master Plan, the Region's waste management plans can be summarized as follows:

- Top priority afforded to waste reduction and recycling.
- Further processing of remaining wastes to reduce their volume.
- Reduced reliance on landfill.

The overall process for obtaining approval of the landfill site is summarized as follows:

Phase 1: Preparation of Work Program
Phase 2, Stage 1: Waste Needs and Systems Analysis
Phase 2, Stage 2: Site Selection
Phase 3: EA Documentation and Submissions

At the present time this process has yielded:

- a comprehensive recycling program
- the approval of 7.96 million cubic metre landfill site in Milton
- on-going investigations for additional recycling, waste processing and energy-from-waste facility(ies).

The conditions in the decision of the Consolidated Hearing Board for the new landfill site set out the long term direction for solid waste management in Halton.

The first condition calls for the establishment of a "Municipal-Regional Waste Management Committee having as its goal the reduction, recycling and reuse of waste so that there is very little remaining to be landfilled". The Board goes on to list a series of 3 Rs measures that are presently being

initiated or investigated. Additional details on these measures are set out in the following Section 4.0 of this report.

As part of a Condition of Approval under the Environmental Assessment Act for the landfill site, and in order that the landfill site achieve a 20 year life, Halton Region is required to construct a facility or facilities to process waste capable of diverting a gross amount of 50% of the total solid waste remaining after recycling in Halton Region during that 20 year period. The total amount of waste (i.e. over the 20 year period) to be diverted to the facility(ies) is estimated to be 1.35 million tonnes. It should be noted that although the Condition of Approval specifies Energy-from-Waste, alternative technologies which can reduce the waste stream by the required amount will also be considered.

Phase 1 of a two-phase program to implement this project to divert the required quantity of waste is currently underway. Phase 1 consists of the studies required to meet the requirements of Ontario's Environmental Assessment Act.

Phase 2 will consist of studies required to address outstanding issues from Phase 1 and begin activities required to obtain a Certificate of Approval.

A consulting firm has been retained to carry out the study in accordance with the requirements of the Environmental Assessment Act. The study is called Phase 1 Evaluation of Options for Waste Management and Energy from Waste. It is anticipated that processing greater amounts of waste will improve the economic viability of any proposed facility. Therefore, the Terms of Reference of the study require that considerations be given to importing waste from areas outside of Halton to supplement the waste that is available. Under this scenario a facility of nominal size up to 2,000 tonnes per day or greater would be considered. This also attempts to recognize the fact that the quantities to be diverted in Halton will be reduced through an extensive source separation recycling program.

Waste Quantities

3.0 WASTE QUANTITIES

The generation of solid waste is a function of a number of factors including population levels, the level and nature of economic activity, and the consumption patterns of the residents, businesses and institutions.

Each of the municipalities within the GTA has developed their own set of projections using similar yet not identical methodologies and assumptions.

3.1 Generated Wastes

The following Tables, presented at the end of this section, illustrate projections of the quantities of waste generated in the communities within the Greater Toronto Area (GTA) over the planning period 1989 through 2011:

3.1 Durham Region
3.2 York Region
3.3 Metro Toronto
3.4 Peel Region
3.5 Halton Region

These tables present estimates developed by the various municipalities of the quantities of waste generated prior to waste reduction, recycling and reuse efforts together with the key assumptions that underlie the forecasts.

In each of the jurisdictions, except Metro and Halton, a set of population and employment projections were developed. In the case of Metro and Halton, only population projections were used. These projections were generally developed by the planning departments in each of the jurisdictions.

Based on historic records of quantities received at public waste management facilities, estimates of waste generation per capita, and in some cases per employee, were developed by each of the municipalities within the GTA. These unit generation rates, used to project the waste quantities prior to recycling efforts, are summarized as follows:

	Population Related Waste (tonnes/person/yr)	Employment Related Waste (tonnes/employee/yr)	Total Waste Per Capita [1] (tonnes/person/yr)
Durham	0.42	1.49	0.879[4]
York	0.39	1.14[2]	1.22 [4]
Metro	0.43	NA[3]	1.15 [4]
Peel	0.43	1.29	1.15 [4]
Halton	NA	NA	0.837

(1) May include effect of some small historic recycling activities.

(2) Excludes construction, demolition and miscellaneous wastes.

(3) Metro employment related wastes forecast on the basis of 0.72 tonnes per capita.

(4) Calculated from estimated total 1989 waste quantities and estimated 1989 population.

Table 3.6 provides an estimate of the total quantity of waste generated within the Greater Toronto Area. This estimate is based on a collective generation rate of 1.083 tonnes per capita per year for 1989 and 1990, and rising in a linear fashion to 1.126 tonnes per capita per year in 2016. This increasing generation rate reflects the underlying assumption that no laws regulating packaging are passed.

Firm recent local data on the composition of the overall waste stream is not available. Over the years some studies of municipal wastes, which make up in the order of 40 percent of the total waste stream, have been undertaken. These studies include:

- Bird and Hale, et al, Municipal Refuse Statistics for Canadian Communities of Over 100,000 (1976-1977), Environment Canada, October 1979.

- Ontario Waste Management Advisory Board, Urban Solid Waste Generation in Ontario, July 1976.

- Franklin Associates, Characterization of Municipal Solid Waste in the U.S. 1960-2000, published 1986.

The industrial portion of the waste stream is highly variable and dependent, in large part, upon the nature of economic activity carried on in a given area. Some limited studies of industrial/commercial wastes have been carried out by some area municipalities; generally as part of specific waste reduction and recycling initiatives. These studies did not yield enough information to make a reasonable estimate of the overall composition of the industrial/commercial waste stream.

3.2 Waste Reduction, Reuse and Recycling

All of the participants in the GTA are actively pursuing these efforts. Some communities have been involved in these efforts over varying time intervals and have achieved varying degrees of reduction. It is difficult to determine the exact quantities diverted to-date by the municipalities within the GTA for the following reasons:

- Reductions in private sector waste quantities cannot be accurately determined.

- Differences in disposal fees may cause variations in the quantities disposed of in particular facilities during particular time intervals.

- There are differences in the record-keeping methods employed by the various communities within the GTA.

Even if current quantity figures were estimated the resulting data might be misleading due to these factors.

Given the above factors coupled with the fact that different communities have adopted different diversion targets for their 3 Rs programs, the reduction levels listed in Table 3.7 are assumed to apply to the total

quantity of waste generated within the GTA. These targets represent the minimum quantity to be diverted and are consistent with the Provincial targets established by the Minister of the Environment.

Table 3.8 illustrates the quantity of waste to be reduced within the Greater Toronto Area by applying this planning assumption to the generated quantities previously presented in Table 3.6.

3.3 Quantities Requiring Disposal

Following the implementation of various waste reduction, reuse and recycling efforts the remaining quantities will require disposal. These quantities presented in Table 3.9 are estimated by subtracting those presented in Table 3.8 from those presented in Table 3.6.

It is possible that all the waste generated within the area may not be received at public sector controlled facilities. Some private sector wastes may be disposed of in private facilities outside the area. In order to illustrate the implication of this possible outcome, the sensitivity analysis illustrated in Table 3.10 was performed. The low range projections presented in this table assume 30 percent of the total generated waste, as per Table 3.6, are not available. This is roughly equivalent to half the wastes generated by the private sector. The diversion target detailed in Table 3.7 are assumed to apply to the remaining 70% of the waste stream and the resulting waste quantities available for landfill and incineration are illustrated in Table 3.10.

TABLE 3.1

DURHAM REGION WASTE QUANTITY PROJECTIONS

YEAR	POPULATION FORECASTED	POPULATION-RELATED WASTE QUANTITIES (1) (TONNES/YEAR)	FORECASTED NUMBER OF EMPLOYEES	EMPLOYMENT-RELATED WASTE QUANTITIES (2) (TONNES/YEAR)	TOTAL SOLID WASTE GENERATION (TONNES/YEAR)
1989	385,480	161,900	118,867	177,100	339,000
1990	397,540	167,000	122,241	182,100	349,100
1991	409,560	172,000	125,850	187,500	359,500
1992	420,725	176,700	128,112	190,900	367,600
1993	430,605	180,900	130,420	194,300	375,200
1994	439,435	184,600	132,774	197,800	382,400
1995	447,560	188,000	135,175	201,400	389,400
1996	455,120	191,200	137,625	205,100	396,300
1997	463,175	194,500	140,125	208,800	403,300
1998	470,920	197,800	142,675	212,600	410,400
1999	478,475	201,000	145,277	216,500	417,500
2000	485,785	204,000	147,933	220,400	424,400
2001	492,925	207,000	150,650	224,500	431,500
2002	500,080	210,000	152,479	227,200	437,200
2003	507,080	213,000	154,333	230,000	443,000
2004	513,935	215,900	156,214	232,800	448,700
2005	520,615	218,700	158,122	235,600	454,300
2006	527,230	221,400	160,057	238,500	459,900
2007	533,460	224,100	162,019	241,400	465,500
2008	539,570	226,600	164,009	244,400	471,000
2009	545,690	229,200	166,028	247,400	476,600
2010	551,800	231,800	168,077	250,400	482,200
2011	558,055	234,400	170,150	253,500	487,900

(1) PROJECTIONS BASED ON 0.42 TONNES PER CAPITA PER YEAR
(2) PROJECTIONS BASED ON 1.49 TONNES PER EMPLOYEE PER YEAR

SOURCE: WASTE MANAGEMENT MASTER PLAN STUDY PROGRESS REPORT
MACLAREN ENGINEERS INC, AUGUST 1989.

TABLE 3.2

YORK REGION WASTE QUANTITY PROJECTIONS

YEAR	POPULATION FORECASTED	POPULATION-RELATED WASTE QUANTITIES (1) (TONNES/YEAR)	FORECASTED NUMBER OF EMPLOYEES	EMPLOYMENT-RELATED WASTE QUANTITIES (2) (TONNES/YEAR)	CONSTRUCTION/ DEMOLITION & MISC. WASTES (TONNES/YEAR)	TOTAL SOLID WASTE GENERATION (TONNES/YEAR)
1989	427,402	166,687	205,591	234,374	121,000	522,000
1990	445,503	173,746	217,043	247,429	117,000	538,000
1991	463,605	180,806	228,495	260,484	113,000	554,000
1992	480,216	187,284	239,948	273,540	110,800	572,000
1993	496,826	193,762	251,400	286,596	108,600	589,000
1994	513,437	200,240	262,853	299,652	106,400	606,000
1995	530,047	206,718	274,305	312,708	104,200	624,000
1996	546,658	213,197	285,758	325,764	102,000	641,000
1997	565,326	220,477	297,526	339,180	106,400	666,000
1998	583,995	227,758	309,295	352,596	110,800	691,000
1999	602,663	235,039	321,063	366,012	115,200	716,000
2000	621,332	242,319	332,832	379,428	119,600	741,000
2001	640,000	249,600	344,600	392,844	124,000	766,000
2002	654,553	255,276	355,737	405,540	121,800	783,000
2003	669,105	260,951	366,874	418,236	119,600	799,000
2004	683,658	266,627	378,011	430,933	117,400	815,000
2005	698,210	272,302	389,148	443,629	115,200	831,000
2006	712,763	277,978	400,285	456,325	113,000	847,000
2007	728,210	284,002	411,548	469,165	114,400	868,000
2008	743,658	290,027	422,811	482,005	115,800	888,000
2009	759,105	296,051	434,074	494,844	117,200	908,000
2010	774,553	302,076	445,337	507,684	118,600	928,000
2011	790,000	308,100	456,600	520,524	120,000	949,000

(1) PROJECTIONS BASED ON 0.39 TONNES PER CAPITA PER YEAR
(2) PROJECTIONS BASED ON 1.14 TONNES PER EMPLOYEE PER YEAR

SOURCE: WASTE MANAGEMENT STUDY FINAL REPORT
MACLAREN ENGINEERS INC., MAY 1989.

TABLE 3.3

METRO TORONTO WASTE QUANTITY PROJECTIONS

YEAR	POPULATION FORECASTED	POPULATION-RELATED WASTE QUANTITIES (1) (TONNES/YEAR)	COMMERCIAL/ INDUSTRIAL WASTE QUANTITIES (2) (TONNES/YEAR)	TOTAL SOLID WASTE GENERATION (TONNES/YEAR)
1989	2,193,706	943,294	1,579,468	2,522,800
1990	2,253,953	969,200	1,622,846	2,592,000
1991	2,314,200	995,106	1,666,224	2,661,300
1992	2,329,190	1,001,552	1,677,016	2,678,600
1993	2,344,180	1,007,997	1,687,809	2,695,800
1994	2,359,170	1,014,443	1,698,602	2,713,000
1995	2,374,160	1,020,889	1,709,395	2,730,300
1996	2,389,150	1,027,335	1,720,188	2,747,500
1997	2,404,140	1,033,780	1,730,980	2,764,800
1998	2,419,130	1,040,226	1,741,773	2,782,000
1999	2,434,120	1,046,672	1,752,566	2,799,200
2000	2,449,110	1,053,117	1,763,359	2,816,500
2001	2,464,100	1,059,563	1,774,152	2,833,700
2002	2,470,430	1,062,285	1,778,709	2,841,000
2003	2,476,760	1,065,007	1,783,267	2,848,300
2004	2,483,090	1,067,729	1,787,824	2,855,600
2005	2,489,420	1,070,451	1,792,382	2,862,800
2006	2,495,750	1,073,173	1,796,940	2,870,100
2007	2,502,080	1,075,894	1,801,497	2,877,400
2008	2,508,410	1,078,616	1,806,055	2,884,700
2009	2,514,740	1,081,338	1,810,612	2,892,000
2010	2,521,070	1,084,060	1,815,170	2,899,200
2011	2,527,400	1,086,782	1,819,728	2,906,500

(1) PROJECTIONS BASED ON 0.43 TONNES PER CAPITA PER YEAR
(2) PROJECTIONS BASED ON 0.72 TONNES PER CAPITA PER YEAR

SOURCE: METROPOLITAN WORKS DEPARTMENT,
MUNICIPALITY OF METROPOLITAN TORONTO, JULY 1989.

TABLE 3.4

PEEL REGION WASTE QUANTITY PROJECTIONS

YEAR	POPULATION FORECASTED	POPULATION-RELATED WASTE QUANTITIES (1) (TONNES/YEAR)	FORECASTED NUMBER OF EMPLOYEES	EMPLOYMENT-RELATED WASTE QUANTITIES (2) (TONNES/YEAR)	TOTAL SOLID WASTE GENERATION (TONNES/YEAR)
1989	664,400	N.A.	325,400	N.A.	761,900
1990	684,900	N.A.	335,900	N.A.	785,300
1991	705,400	N.A.	346,400	N.A.	798,800
1992	725,900	N.A.	357,600	N.A.	809,900
1993	746,400	N.A.	368,800	N.A.	820,900
1994	766,900	N.A.	380,000	N.A.	831,900
1995	787,400	N.A.	391,100	N.A.	845,200
1996	807,900	N.A.	402,300	N.A.	867,800
1997	828,400	N.A.	413,800	N.A.	890,600
1998	848,900	365,027	425,300	548,637	913,600
1999	869,400	373,842	436,700	563,343	937,200
2000	889,900	382,657	448,200	578,178	960,900
2001	910,400	391,472	459,700	593,013	984,500
2002	930,900	400,287	470,600	607,074	1,007,300
2003	951,400	409,102	481,500	621,135	1,030,200
2004	971,900	417,917	492,300	635,067	1,053,000
2005	992,400	426,732	503,200	649,128	1,075,900
2006	1,010,200	434,386	514,100	663,189	1,097,600
2007	1,023,200	439,976	522,000	673,380	1,113,400
2008	1,036,200	445,566	529,900	683,571	1,129,200
2009	1,049,200	451,156	537,900	693,891	1,145,000
2010	1,062,200	456,746	545,800	704,082	1,160,800
2011	1,075,200	462,336	553,700	714,273	1,176,600

N.A. QUANTITY PROJECTIONS TO 1997 DEVELOPED ON A COMMUNITY SPECIFIC BASIS HENCE REGION WIDE SUBTOTALS NOT AVAILABLE

(1) POST 1997 PROJECTIONS BASED ON 0.43 TONNES PER CAPITA PER YEAR

(2) POST 1997 PROJECTIONS BASED ON 1.29 TONNES PER EMPLOYEE PER YEAR

SOURCE: WASTE MANAGEMENT MASTER PLAN UPDATE STAGE 3 FINAL REPORT MACLAREN PLANSEARCH, AUGUST 1988.

TABLE 3.5

HALTON REGION WASTE QUANTITY PROJECTIONS

YEAR	POPULATION FORECASTED	TOTAL SOLID WASTE GENERATION (1) (TONNES/YEAR)
1989	279,700	234,109
1990	283,700	237,457
1991	287,600	240,721
1992	292,800	245,074
1993	297,600	249,091
1994	302,300	253,025
1995	307,200	257,126
1996	311,800	260,977
1997	317,200	265,496
1998	322,800	270,184
1999	328,200	274,703
2000	333,600	279,223
2001	338,800	283,576
2002	344,100	288,012
2003	349,100	292,197
2004	354,400	296,633
2005	359,500	300,902
2006	364,600	305,170
2007	369,600	309,355
2008	374,500	313,457
2009	379,300	317,474
2010	384,200	321,575
2011	389,000	325,593

(1) PROJECTIONS BASED ON 0.837 TONNES PER CAPITA PER YEAR
(0.8 TONNES PER CAPITA PLUS 4.6% TO ADJUST FOR HISTORIC RECYCLING)

SOURCE: BASED ON INFORMATION CONTAINED IN
EPA REVIEW OF WASTE QUANTITY PROJECTIONS
BY C. N. WATSON AND ASSOCIATES LTD. FEBRUARY 1986

TABLE 3.6

TOTAL GREATER TORONTO AREA WASTE QUANTITY PROJECTIONS

YEAR	TOTAL POPULATION (1)	GENERATION RATE (T/C/YR)	WASTE QUANTITY GENERATED	CUMULATIVE WASTE QUANTITY GENERATED	AVERAGE TONNES PER DAY (2)
1989	4,017,000	1.0830	4,350,000	4,350,000	16,731
1990	4,112,000	1.0830	4,453,000	8,803,000	17,127
1991	4,207,000	1.0847	4,563,000	13,366,000	17,550
1992	4,278,000	1.0863	4,647,000	18,013,000	17,873
1993	4,349,000	1.0880	4,732,000	22,745,000	18,200
1994	4,420,000	1.0897	4,816,000	27,561,000	18,523
1995	4,491,000	1.0913	4,901,000	32,462,000	18,850
1996	4,562,000	1.0930	4,986,000	37,448,000	19,177
1997	4,620,000	1.0947	5,057,000	42,505,000	19,450
1998	4,678,000	1.0963	5,129,000	47,634,000	19,727
1999	4,736,000	1.0980	5,200,000	52,834,000	20,000
2000	4,794,000	1.0997	5,272,000	58,106,000	20,277
2001	4,852,000	1.1013	5,344,000	63,450,000	20,554
2002	4,902,000	1.1030	5,407,000	68,857,000	20,796
2003	4,952,000	1.1047	5,470,000	74,327,000	21,038
2004	5,002,000	1.1063	5,534,000	79,861,000	21,285
2005	5,052,000	1.1080	5,598,000	85,459,000	21,531
2006	5,102,000	1.1097	5,662,000	91,121,000	21,777
2007	5,148,200	1.1113	5,721,000	96,842,000	22,004
2008	5,194,400	1.1130	5,781,000	102,623,000	22,235
2009	5,240,600	1.1147	5,842,000	108,465,000	22,469
2010	5,286,800	1.1163	5,902,000	114,367,000	22,700
2011	5,333,000	1.1180	5,962,000	120,329,000	22,931
2012	5,379,200	1.1197	6,023,000	126,352,000	23,165
2013	5,425,400	1.1213	6,084,000	132,436,000	23,400
2014	5,471,600	1.1230	6,145,000	138,581,000	23,635
2015	5,517,800	1.1247	6,206,000	144,787,000	23,869
2016	5,564,000	1.1263	6,267,000	151,054,000	24,104

(1) BASED ON GTA / T & E (MEDIUM SCENARIO) POPULATION PROJECTIONS
(POST 2011 PROJECTIONS BASED ON EXTRAPOLATION OF TRENDS IN PRIOR YEARS)

(2) AT 260 OPERATIONAL DAYS PER YEAR (EXCLUDES SEASONAL PEAKS)

SOURCE: SWISC TECHNICAL COMMITTEE JUNE 1989

TABLE 3.7

TARGET FOR 3RS PROGRAMS

YEAR	PERCENT REDUCTION
1989	10%
1990	15%
1991	20%
1992	24%
1993	25%
1994	25%
1995	25%
1996	25%
1997	35%
1998	40%
1999	45%
2000	50%
2001	50%
2002	50%
2003	50%
2004	50%
2005	50%
2006	50%
2007	50%
2008	50%
2009	50%
2010	50%
2011	50%
2012	50%
2013	50%
2014	50%
2015	50%
2016	50%

SOURCE: SWISC TECHNICAL COMMITTEE JUNE 1989

TABLE 3.8

WASTE REDUCTION REUSE & RECYCLING PROJECTIONS

YEAR	MINIMUM WASTE QUANTITY DIVERTED	CUMULATIVE WASTE QUANTITY DIVERTED	AVERAGE TONNES DIVERTED PER DAY (1)
1989	435,000	435,000	1,673
1990	668,000	1,103,000	2,569
1991	913,000	2,016,000	3,512
1992	1,115,000	3,131,000	4,288
1993	1,183,000	4,314,000	4,550
1994	1,204,000	5,518,000	4,631
1995	1,225,000	6,743,000	4,712
1996	1,247,000	7,990,000	4,796
1997	1,770,000	9,760,000	6,808
1998	2,052,000	11,812,000	7,892
1999	2,340,000	14,152,000	9,000
2000	2,636,000	16,788,000	10,138
2001	2,672,000	19,460,000	10,277
2002	2,704,000	22,164,000	10,400
2003	2,735,000	24,899,000	10,519
2004	2,767,000	27,666,000	10,642
2005	2,799,000	30,465,000	10,765
2006	2,831,000	33,296,000	10,888
2007	2,861,000	36,157,000	11,004
2008	2,891,000	39,048,000	11,119
2009	2,921,000	41,969,000	11,235
2010	2,951,000	44,920,000	11,350
2011	2,981,000	47,901,000	11,465
2012	3,012,000	50,913,000	11,585
2013	3,042,000	53,955,000	11,700
2014	3,073,000	57,028,000	11,819
2015	3,103,000	60,131,000	11,935
2016	3,134,000	63,265,000	12,054

(1) AT 260 OPERATIONAL DAYS PER YEAR
(EXCLUDES SEASONAL PEAKS)

SOURCE: SWISC TECHNICAL COMMITTEE JUNE 1989

TABLE 3.9

WASTE QUANTITIES REQUIRING DISPOSAL

YEAR	MAXIMUM WASTE TO LANDFILL & INCINERATION	CUMULATIVE MAX WASTE TO LANDFILL & INCINERATION	AVERAGE TONNES PER DAY TO LANDFILL & INCINERATION (1)
1989	3,915,000	3,915,000	15,058
1990	3,785,000	7,700,000	14,558
1991	3,650,000	11,350,000	14,038
1992	3,532,000	14,882,000	13,585
1993	3,549,000	18,431,000	13,650
1994	3,612,000	22,043,000	13,892
1995	3,676,000	25,719,000	14,138
1996	3,739,000	29,458,000	14,381
1997	3,287,000	32,745,000	12,642
1998	3,077,000	35,822,000	11,835
1999	2,860,000	38,682,000	11,000
2000	2,636,000	41,318,000	10,138
2001	2,672,000	43,990,000	10,277
2002	2,703,000	46,693,000	10,396
2003	2,735,000	49,428,000	10,519
2004	2,767,000	52,195,000	10,642
2005	2,799,000	54,994,000	10,765
2006	2,831,000	57,825,000	10,888
2007	2,860,000	60,685,000	11,000
2008	2,890,000	63,575,000	11,115
2009	2,921,000	66,496,000	11,235
2010	2,951,000	69,447,000	11,350
2011	2,981,000	72,428,000	11,465
2012	3,011,000	75,439,000	11,581
2013	3,042,000	78,481,000	11,700
2014	3,072,000	81,553,000	11,815
2015	3,103,000	84,656,000	11,935
2016	3,133,000	87,789,000	12,050

(1) AT 260 OPERATIONAL DAYS PER YEAR
(EXCLUDES SEASONAL PEAKS)

SOURCE: SWISC TECHNICAL COMMITTEE JUNE 1989

TABLE 3.10

LOW RANGE PROJECTION OF
WASTE QUANTITIES REQUIRING DISPOSAL (1)

YEAR	WASTE TO LANDFILL & INCINERATION	CUMULATIVE WASTE TO LANDFILL & INCINERATION	AVERAGE TONNES PER DAY TO LANDFILL & INCINERATION (2)
1989	2,740,000	2,740,000	10,538
1990	2,649,000	5,389,000	10,188
1991	2,555,000	7,944,000	9,827
1992	2,472,000	10,416,000	9,508
1993	2,484,000	12,900,000	9,554
1994	2,528,000	15,428,000	9,723
1995	2,573,000	18,001,000	9,896
1996	2,617,000	20,618,000	10,065
1997	2,301,000	22,919,000	8,850
1998	2,154,000	25,073,000	8,285
1999	2,002,000	27,075,000	7,700
2000	1,845,000	28,920,000	7,096
2001	1,870,000	30,790,000	7,192
2002	1,892,000	32,682,000	7,277
2003	1,914,000	34,596,000	7,362
2004	1,937,000	36,533,000	7,450
2005	1,959,000	38,492,000	7,535
2006	1,981,000	40,473,000	7,619
2007	2,002,000	42,475,000	7,700
2008	2,023,000	44,498,000	7,781
2009	2,044,000	46,542,000	7,862
2010	2,065,000	48,607,000	7,942
2011	2,087,000	50,694,000	8,027
2012	2,108,000	52,802,000	8,108
2013	2,129,000	54,931,000	8,188
2014	2,150,000	57,081,000	8,269
2015	2,172,000	59,253,000	8,354
2016	2,193,000	61,446,000	8,435

(1) ASSUMING 30% OF GENERATED WASTE, AS PER TABLE 3.6, UNAVAILABLE DIVERSION TARGETS, AS PER TABLE 3.7, APPLIED TO REMAINIMG WASTES TO YEILD FOLLOWING PROJECTIONS OF QUANTITIES FOR DISPOSAL

(2) AT 260 OPERATIONAL DAYS PER YEAR

SOURCE: SWISC TECHNICAL COMMETTEE AUGUST 1989

Reduction Reuse & Recycling

4.0 WASTE REDUCTION, REUSE AND RECYCLING

The municipalities within the Greater Toronto Area (GTA) have generally afforded top priority to waste reduction, reuse and recycling (3 Rs) programs.

Since the ultimate effectiveness of an overall 3 Rs program is dependent upon uses and markets for specific materials, these programs must be implemented on a sector-by-sector and material-by-material basis. Given this requirement the 3 Rs component of a solid waste management system is therefore much more fragmented and decentralized than other components such as landfills or energy-from-waste facilities.

One of the easiest and most visible components to implement is a source separated "blue box" recycling program for low density urban residential areas. Implementation of this program has tended to fall primarily to the local municipalities who have responsibilities for solid waste collection, however, several of the Regions have played a key role in implementing these programs.

Table 4.1 illustrates the communities that have implemented a basic "blue box" program for collecting newspapers, glass, and metals, together with an indication of the communities that are working on various methods of enhancing the basic "blue box" system. In addition, the municipalities that have implemented and are implementing programs to divert industrial and commercial wastes from landfill and incineration are also identified. The targets that have been established by the communities are also listed.

Generally the basic blue box program manages less than 10 percent of the total wastes generated in a community provided it is well publicized and participation is high among those served. In order to move beyond this figure the blue box program must be enhanced to expand both the number of people served and the number of materials collected. In parallel with these efforts a broad range of programs to divert industrial and commercial wastes are required.

TABLE 4.1

Status of Solid Waste Diversion Programs

	Basic Blue Box	Investigating/ Implementing Enhanced Blue Box	Implementing Industrial & Commercial Programs	Target
Durham		*	*	25% of all Generated wastes by 1992
Newcastle	* (urban areas)			
Oshawa	*			
Whitby	*			
Ajax	*			
Pickering	*			
Scugog	* (urban areas)			
Uxbridge	* (urban areas)			
Brock	* (urban areas)			
York			*	25% by 1995 and 50% by 2011 (may be accelerated to meet provincial targets as opportunities arise)
Markham	*			
Richmond Hill	*			
Vaughan	*			
Whitchurch-Stouffville	*			
Aurora				
Newmarket	*			
King				
East Gwillimbury	*			
Georgina	*			

TABLE 4.1 (Cont'd)

	Basic Blue Box	Investigating/ Implementing Enhanced Blue Box	Implementing Industrial & Commercial Programs	Target
Metropolitan Toronto		*	*	25% of all wastes by 1992 and 50% by the year 2000
Scarborough	*			
East York	*			
Toronto	*			
York	*			
North York	*			
Etobicoke	*			
Peel			*	23% reduction in all waste generated over 40 year planning period (corresponds to 34% of population related waste and 24% of employment related waste by 2001)
Mississauga	*	*		
Brampton	*			
Caledon	*			
Halton		*	*	No fixed targets but currently achieving 15-16% reduction of all wastes (consideration of targets is currently under review)
Oakville	*			
Burlington	* (urban areas)			
Milton	* (urban areas)			
Halton Hills	* (urban areas)			

Although the operational aspects of the basic "blue box" program are well established, many of the following methods for enhancing the basic system are still in the development and prototype stage.

The primary options for expanding the number of people served involves developing an effective system for servicing apartments and expanding service to rural areas.

The Region of Halton has just initiated an apartment program, while a number of communities including Metro and Mississauga are running test programs to identify viable methods for servicing apartments and other high density dwellings. Rural residents can be served either by the same "blue box" curbside program provided in urban areas or by a rural depot network.

In addition to the materials already collected, additional materials may be added. These include:

- other clear plastics (e.g. shampoo bottles)
- other non-film plastics (e.g. cottage cheese containers)
- old corrugated cardboard, and
- used motor oil.

The addition of these materials will require a change in the materials handling strategy.

At present materials are sorted at source into three compartments on a truck. As different materials are added additional truck compartments may be required. Alternatively dry materials can be co-mingled on the truck and sorted at a recycling centre. This sorting of co-mingled dry materials may also be required to sort glass by colour to better respond to market demands.

In addition to the basic source separation program many of the communities within the GTA have initiated (or are planning to initiate) a number of

other programs including:

- Public education and promotional programs
- Promotion of home composting
- Separate collection and composting of garden wastes and leaves in the spring and fall
- Household hazardous waste programs
- Programs to recover paper from offices
- Programs to recover cardboard from commercial and industrial generators (coupled with bans on cardboard at landfill sites)
- Programs to demonstrate how to recover selected building materials (coupled with potential material bans)
- Programs to recover various grades of paper from offices and institutions
- Revisions to building codes to better provide for recycling efforts
- Procurement programs to establish standards and specify products with recycled contents, and
- Programs to assist industries in reducing, reusing and recycling a wide variety of materials from their solid waste stream.

Details on targets and specific programs within the participating communities is presented below.

4.1 Durham

The Regional Municipality of Durham has established a target to reduce the overall quantity of waste requiring disposal by 25 percent by 1992.

The Region's recycling system is operated by Durham Recycling Centre Inc. This organization provides collection, operates a Regional Recycling Centre and markets the recovered materials. The centre is located in the Town of Whitby near the intersection of Taunton and Thickson Roads. In addition to supporting the basic curbside collection system for urban areas and depots for rural areas the Region is investigating and implementing a number of "beyond curbside" measures for the following materials:

- Household hazardous wastes
- Corrugated cardboard, kraft paper from a wide range of sources
- Newsprint including waste news and over-issue quantities
- Fine paper from offices and printers
- Other paper grades from institutional, commercial and industrial generators
- Organic materials from households, food stores and processors
- Brick, block and lumber from demolition and construction wastes
- Plastics from commercial/industrial scrap, and
- Additional glass and metal from commercial and industrial sources.

Some of the activities currently planned by the Region include:

- The household hazardous waste program
- A composting demonstration followed by construction of a central composting facility
- Fall collection and composting of leaves
- A pilot apartment recycling program
- Expansion of the recycling drop-off depot network
- A pilot mixed paper recycling program
- Demolition/construction wastes initiative
- Acquisition of additional recycling vehicles
- Expansion and improvement of the recycling centre
- Promotion of industrial/commercial waste reduction
- A wood recycling project, and
- A PET/mixed plastics recycling project

Additional details on the various Durham Region initiatives are presented in Section 3.0 of the Waste Management Study Update Report of July 1988.

4.2 York

Most area municipalities in York Region have, or soon will have, Blue Box curbside programs. Given the rapid pace with which various 3 Rs efforts are

advancing in Metro and the surrounding Regions, the Region of York is presently assessing an appropriate 3 Rs target. It is recognized that the basic Blue Box program will only achieve a 10 to 15 percent reduction of residential waste and that additional efforts are required to achieve higher targets.

In a waste management study of May 1989, recently adopted by Regional Council, targets for diversion from landfill and incineration of 25% by 1995 and 50% by 2011 were included. In establishing these targets it was recognized that they may be accelerated to correspond with the provincial targets should opportunities arise.

The Region is proposing to establish a recycled materials processing facility. A summary of program components that are currently being considered by York Region include:

- Expansion of the "blue box" system
- Development of a range of industrial and commercial waste reduction, reuse and recycling (3 Rs) initiatives
- Various 3 Rs initiatives for construction and demolition wastes
- Development of a "source reduction" program
- Promotion and support At-Source direct composting
- The collection and central composting of "pure organic" wastes
- Establishment of Dry Sorting Operations
- Development of markets for additional materials
- Support and encouragement of private sector waste reduction, reuse and recycling efforts
- Round table discussions among business and community leaders together with municipal staff to coordinate and promote the various 3 Rs efforts, and
- Collection and central composting of pure organic wastes.

Additional details on these 3 Rs initiatives being considered by York Region are presented in Section 3.0 of the Waste Management Study Report to the Regional Municipality of York of May 1989.

4.3 Metro

The Municipality of Metropolitan Toronto initially established a 3 Rs target of 30 percent reduction by 1990 in January of 1989. Metro Council subsequently endorsed, in April 1989, the provincial targets of 25% by 1992 and 50% by the year 2000. In order to achieve this large reduction a previously unprecedented level of effort and commitment will be required.

In response to this challenge the Commissioner of Works has recommended a comprehensive set of measures including:

- Increasing disposal fees and moving to a user-pay system at landfill sites
- Introducing a broad range of specific initiatives and pilot programs
- Banning a number of recyclable materials from landfill sites
- Requesting other levels of government to undertake complementary and supportive initiatives
- Public involvement and education programs on the solid waste disposal problems, options for solution and their ramifications, and
- A series of emergency measures for responding to the impending shortfall in landfill capacity.

The 33 specific 3 Rs measures recommended in December of 1988 are as follows (comments on the status of these initiatives as of August 1989 are presented in brackets):

"Disposal fees as incentive to reduce waste:

(1) increase the user fees charged to private haulers at Metropolitan Toronto landfill facilities from $50.00 to $83.33 per tonne, and from $65.00 to $100.00 at transfer stations, as of May 1, 1989; (this fee structure is in place)

(2) request the Province to amend the Metropolitan Toronto Act to allow a user fee to be charged to the six area municipalities and

local boards, with a further report to be submitted describing the detailed basis of a user charge system that will provide the necessary incentive, and that the Regions of Durham and York be requested to adopt a user pay system to distribute their costs directly to their area municipalities. (the request has been initiated)

Require/request action by Metropolitan Toronto, the area municipalities and Durham and York Regions by September 1989, except where otherwise noted, to:

(3) establish multi-material curbside collection of recyclables for apartments, and commercial areas serviced by municipal collections, with capital and operating cost contributions from Metropolitan Toronto on the same basis as for the single-family blue box program; (most programs are in place)

(4) reduce the number of collections of non-separate waste per week to encourage reduction and composting at source, and to minimize the additional cost of undertaking separate collections; (decision is under consideration by area municipalities)

(5) immediately establish office paper recovery programs at all Metropolitan and municipal facilities and operations, including boards, agencies and commissions (e.g. Canadian National Exhibition, schools, etc.), as well as programs to recover any other recyclable material; (implementation is in progress)

(6) include as many other materials as possible, such as mixed plastic bottles, in their recycling collection programs, when the market for these materials is confirmed; (implementation is in progress)

(7) implement special spring and fall collections for organic yard wastes, including grass clippings, brush, trimmings, etc., and advertise the dates of these special collections to maximize

recovery; (an 8-week pilot program implemented, major effort planned for fall leaf collection)

(8) establish a pilot program for wet/dry collection and processing for a total of 20,000 homes per year in Metropolitan Toronto; (following a fact finding mission it was decided to undertake a pilot collection of wet organic material for composting)

(9) co-operate with Metropolitan Toronto (i.e. other municipalities were requested to co-operate with Metro) to establish a 190 tonne per day composting plant to compost organic rich loads from residential, commercial and industrial sources subject to a further report on the preliminary design, siting and cost to be submitted by January 1989; (work on implementing this facility is proceeding)

(10) investigate a requirement in the development review process to ensure all new buildings include recycling systems and a plan for the recovery of at least the materials separately collected in "blue box program". (investigations are continuing)

Ban the following materials from Metropolitan disposal sites, for which alternative recycling and/or disposal sites are, or when they are, available:

(11) all loads containing more than 50 per cent by volume of recyclable corrugated cardboard by February 1, 1989; (this ban is in place and plans call for it to be tightened to 20% in the fall)

(12) all leaves, except those which the municipalities will collect in bulk or in designated bags in separate loads only, for composting in Metropolitan Toronto, private, or their own compost sites; with the cost of leaf bags, advertising and composting being borne by Metropolitan Toronto, by September 1989;

(13) tires and wood wastes; (a facility to recycle tires is being developed, and an approach for wood wastes is still being investigated)

(14) large appliances ("white goods") immediately; (ban in place)

(15) demolition and construction wastes, excavated material and other non-putrescible waste that may be specified, as of June 1, 1989; (options for demolition and construction wastes are still being investigated)

(16) waste drywall (negotiations with a proponent are in progress);

(17) incinerated sewage sludge ash, as of June 1, 1989; (no ash disposed of in Metro landfill sites)

(18) digested sewage sludge, by installation of additional sludge dewatering equipment at the Main Treatment Plant, and by installation of storage and unloading equipment at the Highland Creek Treatment Plant to permit use of available incineration capacity by June 1990; (implementation in process)

(19) digested sewage sludge, by requesting proposals for land application at other than Metropolitan sites; (this approach is still under review)

Requests to other levels of government for implementation by June 1989, except where otherwise noted: (letters making these requests have been sent out)

(20) the Province of Ontario establish, expand and promote office paper recovery programs at all its offices within Metropolitan Toronto, as well as programs to recover any other recyclable materials;

(21) the Government of Canada establish, expand and promote office

paper recovery programs at all its offices within Metropolitan Toronto, as well as programs to recover any other recyclable materials;

(22) the Provincial and Federal governments take immediate legislative and regulatory steps to reduce packaging, to require packaging which cannot be eliminated to be easily recyclable, and to reduce production of non-durable goods;

(23) the Provincial Ministries of the Environment, Energy and Transportation assist in the development of a market for waste tires by encouraging the use of powdered or crumbed rubber as a fuel supplement in cement kilns, in coal-fired energy production plants, and as an asphalt additive in paving materials;

(24) that Ontario Hydro consider the use of powdered or crumbed rubber as a fuel supplement at its coal-fired generating stations to assist in the development of a market for waste tires;

(25) that the Ministry of the Environment facilitate the diversion of selected recyclable wastes from Metropolitan Toronto to processing facilities located in other jurisdictions where capacity is available and does not exist in Metropolitan Toronto;

(26) that the Ministry of Education include in the 1989 school curricula for all elementary and secondary schools, information on the waste management situation, the options for solution, and their ramifications;

(27) that the Ministry of the Environment establish target dates to announce prohibition of disposal at landfill sites, throughout Ontario, of recyclable materials for which recycling technologies and markets are being developed, to be effective as soon as each facility or market is available, as a means of encouraging their development.

Involvement of Residents:

(28) request that in addition to participating in the blue box program, the residents of Metropolitan Toronto be requested to compost as much of their organic wastes as possible in their own background, and to change their buying and household habits and patterns to reduce, reuse and recycle; (18,000 composters have been given out)

(29) implement a public education program to inform the public, including industry and commerce, on the solid waste disposal problems, the options for solution, and their ramifications, at a gross estimated cost of approximately $2.5 million in 1989 and approximately $2 million over the period 1990-93; (implementation in progress)

Metropolitan Toronto Legislative Actions by June 1989:

(30) prepare a comprehensive solid waste management by-law governing the receipt of wastes at Metropolitan facilities and setting out the enforcement and penalties for violation; (implementation in progress)

(31) adopt a comprehensive procurement policy which gives preference to products and supplies that can be demonstrated, at least in part, to have been manufactured with materials derived from recycling programs and discuss a co-ordinated effort with the area municipalities, Regions of Durham and York, and the Provincial and Federal governments; (implementation in progress)

(32) develop and test a manifest system to control generation and disposal of certain types of waste and to assist with recycling and waste management planning; and (this measure is still under review)

(33) apply for the necessary legislative amendments required to give

effect to the foregoing recommendations. (implementation is in progress)"

Additional details on these measures are presented in the December 6, 1988 Report to the Metropolitan Works Committee from the Commissioner of Works on "Waste Reduction and Recycling Plan", and the subsequent December 16, 1988 Report of the Works Committee to Council.

4.4 Peel

The Regional Municipality of Peel Solid Waste Master Plan recommended reducing the total quantity of waste to be disposed of over its 40 year planning period by 23 percent. This is a cumulative target that involves reducing population related wastes by 34 percent and employment related wastes by 24 percent by the year 2001. All three communities within Peel have established their own "blue box" recycling programs and the Region, together with the municipalities, are actively pursuing a broad range of additional measures.

The additional measures directed at population related wastes by both the area municipalities and the Region include:

- Recycling depot at area landfill sites
- Recycling efforts undertaken by the Mississauga Clean City Campaign
- Church paper recycling efforts
- Battery recycling (recovery) through a central retail store
- Salvaging operations at the Caledon landfill site
- The availability of a clean fill directory to assist in keeping it out of landfill sites
- Waste diversion credits paid by the Region to public sector groups to promote their efforts
- Fall brush and leaf collection and composting together with Christmas tree chipping
- Recycling approaches for apartment buildings are being investigated

- Home composters are being made available to residents
- The separate regular collection and composting of organic materials is being demonstrated
- A household hazardous waste depot operates at the Britannia landfill site
- Used oil drop-off sites are available throughout the Region, and
- Educational and promotional efforts in support of the above activities are on-going.

In an effort to reduce industrial and commercial wastes, the Region operates a number of programs directed at employment related wastes. These include:

- An on-going program of contacting companies, performing waste audits and facilitating the exchange of wastes
- A central collection and sorting facility for industrial and commercial wastes is planned
- A fine paper recovery program operates in municipal offices and schools
- Clean rubble is received in a separate area and used for road construction at landfill sites
- Concrete is recycled by Fermar Asphalt Ltd., while asphalt is recycled by area companies, and
- A cardboard ban is in place and bans on tires, drywall and wood are under consideration pending development of viable recycling options.

The tipping fees charged to private sector haulers also serve as an incentive to reduction. The current and projected tipping fees per tonne are as follows:

July 1988	-	$49.50
July 1989	-	$70.00
January 1990	-	$90.00
July 1990	-	$95.00

A diversion credit is paid to non-profit organizations and area municipalities for diverting wastes from landfill. This credit was $15.00

per tonne as of January 1, 1988 and was increased to $20.00 per tonne as of January 1, 1989.

4.5 Halton

The Regional Municipality of Halton has been involved in recycling efforts for a number of years. Regional staff estimate that they are currently reducing the residential portion of the waste stream by approximately 20 percent, and reducing or diverting the commercial/industrial stream by 12 percent. This yields an overall waste reduction of approximately 16 percent. In this system the Region operates the collection of residential recyclables and processes/markets those materials as well as what is delivered by business and industry at a Regional Recycling Centre. The Region has not adopted a formal diversion target at this time.

The specific programs and measures currently in place include:

- A comprehensive source separation recycling program for newspapers, glass, metal, PET and old corrugated cardboard. Service is provided to:
  - urban low density zones via a blue box program
  - apartments and condominiums via a system involving placing 3 large bins in the complex (1 set per 30 units). These bins are hydraulically loaded into the same truck that serves the standard blue box program
  - rural recycling via a network of drop-off depots.
- A paper recovery program for municipal offices.
- Initiatives in battery recycling.
- The introduction of a mandatory recycling by-law in January, 1990.
- A ban on cardboard at all regional disposal facilities.

- Once viable recycling approaches become available for drywall, tires and construction lumber, the Region will likely ban these materials from their facilities.

- Recyclable materials are processed at a recyclable materials facility owned by the Region but operated by a private contractor. This centre is located in Oakville on the South Service Road near Bronte Road.

- Sewage sludge is banned from disposal facilities and is currently applied to agricultural land.

- The current high tipping fee of $83.50 charged directly to area municipalities and the private sector serves as an incentive to waste reduction and diversion efforts.

- Plans call for two household hazardous depots in the Region. The first currently operates once per month, the second, when it is opened, will be operational five days per week.

In addition to the above measures the Region is also examining a variation of the European "wet dry" system. This involves collecting dry recyclable materials via an expanded blue box program coupled with the separate collection of clean organic materials. These organic materials could be composted in a central facility. Other solid wastes would continue to be collected and disposed of in the traditional manner.

Other planned programs include:

- Collection of mixed plastics
- Expanded depot system to recreational and high traffic areas through use of "Igloo" container system
- Collection of commercial glass, and
- Expansion of blue box program to rural areas.

Existing Landfills

5.0 EXISTING LANDFILLS

There are a number of landfill sites with varying amounts of capacity currently operating within the Greater Toronto Area. The location of these facilities is illustrated in Figure 1.

Table 5.1 provides a summary of the sites, the estimated current annual quantity of waste being placed in these sites, their estimated remaining capacity as of January 1, 1989 and information on any proposed expansion to this capacity.

The three major sites in the area include:

- Brock West in Pickering (Durham Region)
- Keele Valley in Maple (York Region)
- Britannia in Mississauga (Peel Region)

Details on these and the other smaller sites are presented in this section.

In addition to the facilities within the GTA, some solid waste is disposed of in private facilities outside the area. The Steetley landfill is an example of one such facility.

5.1 Durham

The vast majority of the municipal solid waste generated in the Region of Durham is disposed of in the Brock West landfill site. This site is owned and operated by Metro Toronto. It receives approximately 325,000 tonnes of waste per year from the following areas in Durham:

- Town of Pickering
- Town of Ajax
- Town of Whitby
- City of Oshawa
- Township of Scugog

TABLE 5.1

Summary of Landfill Capacity
(as of January 1, 1989)

Region [1] and Site	Annual [3] Quantity (Tonnes)	Remaining [3] Firm Capacity (Tonnes)	Proposed Capacity Expansion (Tonnes)
Durham Region			
Laidlaw (Newcastle)	40,000	45,000	-
Brock	5,000	45,000	-
Scott	2,000	22,000	-
York Region			
Schomberg (King Twp)	5,000	-	-
Third Concession (King Twp)	1,800	-	-
Georgina	15,000	-	75,000
Metro			
Brock West (Town of Pickering)	1,200,000	1,500,000	-
Keele Valley (Town of Vaughan)	2,000,000	12,700,000	-
Peel			
Britannia	700,000	1,200,000 [2]	-
Caledon	47,000 m^3	444,000 m^3	-
Albion	NA	will close Dec 31, 1990	-
Halton			
Site "D"		Possible 3,900,000 starting in 2-3 years	

(1) See Figure 1 in summary for illustration of location of facilities.

(2) Capacity based on closing the site in 1990 as per agreement; additional 900,000 tonnes of capacity available if the site is filled to approved contours.

(3) Estimates provided by representatives of various Regions and may be subject to up-date.

- Other parts of Durham Region, and
- Private sector generators in the area.

Details on this site are provided in the following Section 5.3 on Metro.

In addition to this site there are a number of other sites in the Region.

Laidlaw Wastes Systems Ltd. owns and operates a landfill site (formally known as the Hale site) in the western side of the Town of Newcastle. It is presently licensed to receive approximately 40,000 tonnes of waste per year. As well as disposing of wastes from Newcastle this site also receives some commercial/industrial waste from Oshawa as well as some materials from the neighbouring counties of Victoria, Peterborough and Northumberland.

The Brock landfill site serves Brock Township in the northern part of the Region. It receives approximately 5000 tonnes of waste per year and had a remaining capacity of approximately 45,000 tonnes as of January 1, 1989. This site is owned by the Region. Operation is provided by a private contractor.

The Scott landfill site is located in the northern portion of the township of Uxbridge and provides service to the surrounding area. It is owned by the Region and operated by a private sector contractor. This site receives approximately 2,000 tonnes of waste per year and had a remaining capacity of approximately 22,000 tonnes as of January 1, 1989.

The Pedersen site is a privately owned facility located in and serving Uxbridge. It is very near capacity and will close at the end of 1989.

Other landfill sites in the Region that have closed recently include the Darlington site and Scugog landfill site.

Additional details on these sites are provided in Chapter 2 of both the Regional Municipality of Durham Waste Management Study of May 1985 and the Waste Management Study Update Report of July 1988.

5.2 York

Most of the waste generated in the Regional Municipality of York is disposed of in the Keele Valley landfill site. This site, located in the Town of Maple, is owned and operated by Metro Toronto.

It receives wastes from the following communities:

- Town of Vaughan
- Town of Markham
- Town of Richmond Hill
- Town of Aurora
- Town of Newmarket, and
- Town of Whitchurch-Stouffville

Details on this site are provided in the following Section 5.3 on Metro.

There are two small landfill sites in the Township of King: the Schomberg and the Third Concession sites. It is estimated that the Schomberg site receives approximately 5,000 tonnes of waste per year while the Third Concession site receives in the order of 1,800 tonnes per year. The Schomberg site is nearing its capacity and the Third Concession site can likely not receive additional wastes. The Town of Georgina disposes of its wastes in a private site owned and operated by LaRue Disposal. This site receives in the order of 15,000 tonnes of waste per year. This site is very nearly at its approved capacity. The Town is presently investigating amending the approved final contours to permit an additional 5 years capacity at the site.

An inert, cleanfill disposal site is operated in the Town of Markham by Markham Disposal. MacLaren Engineers, in a report to the Region, estimate it receives in the order of 100,000 tones of inert material per year. Data on the total remaining capacity of this site is not available.

Additional details on these facilities serving the Region are presented in the Regional Municipality of York's Waste Management Study of May 1989.

5.3 Metro

The two landfill sites owned and operated by the Municipality of Metropolitan Toronto are Brock West site and Keele Valley site.

The Brock West landfill site is located in the Town of Pickering, west of Brock Road and north of the 3rd Concession. The overall capacity of the site is approximately 15.6 million tonnes. The overall site has an area of 123 ha of which 64.4 ha is designated for landfilling. In 1988 it received approximately 1.3 million tonnes of waste, 1.0 million tonnes from Metro and the balance from Durham Region (at present this site is receiving slightly less than this quantity). The remaining capacity of this site was estimated at approximately 1.5 million tonnes as of January 1, 1989.

The Keele Valley landfill site is located north of Major Mackenzie Drive and east of Keele Street in the community of Maple within the Town of Vaughan. This site, with an overall capacity of 20 million tonnes, began operations in 1983. The total site area is 376 ha of which 99 ha is designated for landfilling. At present it is receiving approximately 2.0 million tonnes per year and there was approximately 12.7 million tonnes of capacity remaining as of January 1, 1989.

Under one of the terms associated with the development of the Keele Valley site, Metro undertook to provide York with landfill capacity for 20 years or until 2003.

5.4 Peel

There are three active landfill sites within the Region of Peel. All three are controlled and operated by the Region. The Britannia site serves the Cities of Brampton and Mississauga while the significantly smaller Caledon site serves most of the Town of Caledon. The Albion site provides local

service to a number of residents of Caledon who reside near it.

The Britannia site is located south of Britannia Road and west of Hurontario Street in the City of Mississauga. This 83 ha site began operation in 1982 and has an overall capacity of 7.6 million tonnes. The site is presently receiving approximately 700,000 tonnes of waste per year and it had an estimated remaining capacity of just over 2 million tonnes as of January 1, 1989. This indicates capacity to last beyond 1990. As part of the agreement associated with the original siting of this facility, it was agreed that it would close in May of 1990 and be replaced with a new site.

The Caledon landfill site is located south of the 15th Side Road and west of Highway 10. As there are no scales at this site, quantities are estimated in cubic metres. This site presently receives approximately 47,000 m^3 of waste per year and has an additional remaining capacity of 440,000 m^3. Given the trends in waste generation this site is expected to be filled by the end of 1995.

In addition to the Caledon site the Albion site, located west of the 5th Line and south of the 20th Side Road, is open to receive wastes from local residents. Under the agreement with the Metropolitan Toronto Region and Region Conservation Authority, this site will close on December 31, 1990.

Extensive efforts have been expended over the past several years towards developing new landfill capacity in the Region. As a result of these efforts an area known as "Site VI" south of Mayfield Road and west of Airport Road in the City of Brampton has been identified. An environmental impact assessment report along with other supporting documents has been prepared on this site. As discussed in Section 2.4, the Environmental Assessment Hearing on this site has been delayed pending resolution of the concerns expressed by the Ministry of the Environment regarding the site selection progress.

Landfill site selection activities have been initiated in the Town of Caledon and in the City of Mississauga but no preferred sites have been

identified as yet. Traditionally the Town has disposed of its wastes in sites within the Boundary of the Town.

5.5 Halton

The Regional Municipality of Halton has had a serious lack of landfill capacity over the past several years. Its last landfill, located in Burlington, closed in December 1988.

All wastes that are not recycled are exported. The majority of the residential waste, or about 45 percent of the total Regional solid waste stream, is hauled to an incinerator operated by Occidental Petroleum in Niagara Falls, New York. The remainder of the waste is exported to two private landfill sites. Approximately 40 percent of the total waste, primarily industrial and commercial wastes, is disposed of in Walker Brothers landfill site in Niagara Falls, Ontario. The remaining 15 percent of the overall waste stream is disposed of in a landfill site operated by Steetley Industries.

In February of 1989 the Region received approval, under the Environmental Assessment Act, to develop a 7.96 million cubic metre (3.9 million tonnes) landfill site in an area known as Site D in the Town of Milton. This site is located between Highway 25 and the first line approximately 1 km south of Britannia Road.

This decision with respect to Site D was appealed to Cabinet by several parties. This appeal was denied and a request for a Judicial Review of the decision is still pending. Given the legal process currently underway, coupled with the requirement to obtain Ministry of the Environment approval on a number of specific conditions of approval, it will likely be another 2 to 3 years before this site will be in a position to accept any wastes (assuming the current request for a Judicial Review is denied).

In addition, it should be noted that several private sector firms are in the process of meeting the requirements of the Environmental Assessment Act in order to apply for approval of new landfill capacity to serve the Greater Toronto Area.

Other Facilities

6.0 OTHER FACILITIES

In addition to the recycling facilities and landfill sites detailed in the previous sections there are a number of other facilities including transfer stations and a potential energy-from-waste facility within the municipalities of the Greater Toronto Area.

6.1 Durham

In addition to the recycling centre and the landfill sites discussed previously, there are several other solid waste management facilities within the Region. These other facilities include the three transfer stations; the Oshawa Transfer Station and two rural stations, located at old landfill sites. These two rural facilities are the Cartwright and the Scugog transfer stations. These facilities also serve as rural recycling depots. There are also other private captive facilities such as the 91 tonne (100 ton) per day energy-from-waste plant operated by GM at their Oshawa plant. Such facilities are not available to the Region and wastes processed or disposed of in such facilities are not included in the waste quantities presented earlier.

6.2 York

In addition to the landfill sites in York Region there is a compaction transfer station located in southern Markham off Woodbine Avenue. This facility is operated by Markham Disposal and it processes approximately 100,000 tonnes per year. It is possible that limited recycling efforts could be operated at this facility in the future.

6.3 Metro

Metro has established and owns seven transfer stations where collection vehicles can dispose of their loads close to collection routes and thereby increase the turnaround and reduce haulage costs. At the transfer stations the refuse is compacted and reloaded into large transfer vehicles for

transport to landfill. The locations of these facilities are illustrated in Figure 1 and their characteristics are summarized in Table 6.1. Details on these facilities are provided below.

6.3.1 Disco

The Disco Transfer Station is located in the City of Etobicoke at the north-west corner of Carlingview Drive and Disco Road. The design capacity is 1000 tonnes per day.

The station consists of 2 - 90,000 kg capacity computerized weighscales, a fully enclosed 5 level building housing a tipping floor, a flat floor refuse holding area, and 4 compaction units consisting of a hopper and hydraulic ram. The refuse is stockpiled and loaded into hoppers with rubber tired and track front-end loaders, respectively. The compaction unit is capable of loading 70 m^3 open-ended trailers with a 27 tonne payload in a period of 20 minutes. Refuse is then hauled to the Keele Valley Landfill under private contract.

The facility has allowed for expansion with provisions for installation of an additional compaction unit.

6.3.2 Bermondsey

The Bermondsey Transfer Station is located on Bermondsey Road, south of Eglinton Avenue East in the City of North York. This station, with a design capacity of 900 tonnes per day serves the Cities of Toronto, North York, Scarborough, and the Borough of East York.

The facility includes a weigh station, a fully enclosed building containing 9 unloading bays, a tipping floor, and 4 Dempster stationary compaction units. Each unit consists of a 10 m^3 hopper and a hydraulic ram with a compacting force of 50 tonnes. Transfer trailers with average payloads of 20 tonnes transport the refuse to landfill.

TABLE 6.1

Summary of Metro Transfer Station

Facility Name	Description	No. of Shifts Currently Operating	Additional Compactor Space Available?	Surplus Storage Space Available for 1 more shift?	1988 Throughput (tonnes)	Estimated Ultimate Throughput*
Disco Road	. Flat floor refuse storage . 4 compaction units	1	No; a 5th has been installed for recycling only	Yes	222,280	445,000
Bermondsey	. Flat floor refuse storage . 4 compaction units	2.3	No	Yes	232,663	233,000
Ingram	. Flat floor refuse storage . 2 overhead compactors	3	Yes; 1 more	Yes	332,161	500,000
Symes	. Flat floor refuse storage . 2 compactor units	1	No	No	104,704	105,000
Victoria Park	. Flat floor refuse storage . 4 compaction units	1	Yes; 1 more	No	127,379	160,000
Scarborough	. Surge pit refuse storage . 4 compaction units	1	Yes; 1 more	Yes	174,581	436,000
Dufferin	. Flat floor refuse storage . 2 compactor units	1	No	No	111,766	112,000

* Note: Estimated ultimate throughput achieved by adding one shift (if possible) and/or adding one more compactor (if possible).

6.3.3 Ingram

The Ingram Transfer Station is located at 50 Ingram Drive in the City of North York. The capacity of this facility is 1100 tonnes per day. This station's mode of operation is different from other new sites in that transfer trailers are filled and compacted through an open top arrangement. This is aimed to provide increased flexibility in bulky materials handling.

The site consists of a central scale house and a fully enclosed building of 1043 m^2. Incoming refuse is dumped on a receiving floor where the waste is crushed and moved by crawler dozers to one of two open loading slots. The refuse is pushed through the slot and into the open topped transfer vehicle where it is compacted with an overhead solid waste compactor. Transfer trailers rest on weighscales during filling to ensure that highway limitations are met.

6.3.4 Symes

The Symes Transfer Station is located at 150 Symes Road in the City of Toronto. Originally established as an incineration facility, the incinerator was shut down in 1970 and converted to a transfer station in 1976. Throughput in 1986 was approximately 100,000 tonnes of solid waste.

Unlike the other stations this facility is not equipped with a computerized weighscale system, but uses a tare bar system operated by weighmasters from a central weighscale facility. Incoming refuse is loaded into two compactor units which are fed by an overhead crane. Haulage to the Keele Valley Landfill is undertaken by Metro forces and equipment in 57 m^3 transfer vehicles.

6.3.5 Victoria Park

The Victoria Park Transfer Station is located in the City of North York at the south-west corner of Victoria Park and McNicoll Avenue.

The facility includes a scale house equipped with two 21 metre weighscales and a fully enclosed two level building. The building consists of a tipping floor, a flat refuse holding area, 12 truck bays, and 4 Dempster stationary compaction units. Transfer trailers can be loaded in a period of 20 minutes by the hydraulic ram that cycles at a rate of one cycle per minute and generates a compaction force of 50 tonnes. Total capacity is 900 tonnes per day. Transport to landfill is undertaken under contract with private haulers.

Unique features of this facility are an in-floor slab electric heating system for the tipping area during winter conditions and extensive dust control measures. Provisions have been made for future expansion and installation of a shredder, magnetic separator and an additional hopper should resource recovery be implemented.

6.3.6 Scarborough

The Scarborough Transfer Station is located at the south-west corner of Markham Road and Nuggett Avenue, in the City of Scarborough. The facility has a capacity of 1000 tonnes per day, with provisions for a resource recovery plant, should it be desired in the future.

The operation is enclosed in a 6500 m^2 building. The building has a tipping floor with nineteen tipping bays, a surge pit for storage, and four charging hoppers each equipped with a Model 1000 Heil compactor. Front-end loaders are used for crushing the refuse and loading the hoppers. Trailers are loaded in a 20-minute period and then trucked to landfill by a private hauler.

6.3.7 Dufferin

The Dufferin Transfer Station is located at 35 Vanley Crescent in the City of North York. The facility is housed in one of three buildings that comprised the former Environment Ontario Centre for Resource Recovery. The station has a capacity of approximately 500 tonnes per day.

6.3.8 Private Sector Transfer Stations

In addition to the above Metro Transfer Stations there are two major private sector facilities.

The Waste Management Inc. (WMI) facility receives wastes from their industrial and commercial customers. These wastes are then transferred and hauled to Metro's landfill sites.

The Harkow facility receives construction and demolition wastes. These materials are disposed of in the Steetley Landfill which is outside the area.

Both of these facilities are located near the core of Toronto in the Cherry/Commissioners Street area.

6.4 Peel

Although there are no transfer stations in the Regional Municipality of Peel there may be a 410 tonne (451 ton) per day resource recovery energy-from-waste plant built within several years. The undertaking of such a plant by Peel Resource Recovery Inc. (PRRI) has received approval under the Environmental Assessment Act. This plant is to be located on Bramalea Road, south of Steeles Avenue.

Some of the key aspects of this plant include:

- Delivery of waste at an agreed tipping fee by the Region of Peel.
- The front-end processing of waste by a "NRI" system to enhance the fuel and remove recyclable materials.
- The incineration of waste and production of steam in four, 100 ton modular units (i.e., 364 tonne (400 tons) per day of incineration capacity).

- The production of electricity for sale to Ontario Hydro.

In addition to the PRRI facility, St. Lawrence Cement is undertaking an Environmental Impact Assessment to supplement the fuel supply to its Mississauga lime kiln with solid waste from Peel and Halton. An environmental assessment hearing has not begun on this undertaking as yet.

6.5 Halton

Virtually all Halton wastes not recycled are exported to external disposal facilities (Ford in Oakville operates its own 66 tonne (73 ton) per day energy-from-waste plant). The vast majority of Halton wastes are handled at two transfer stations. These facilities are both privately owned. In addition there is also a small transfer station in Milton.

6.5.1 Norjohn Transfer Station

This new facility is located at Appleby Line and the QEW in Burlington. It is owned and operated by Norjohn Transfer Station Limited, a unit of A.K. Walker Brothers. The facility has a licensed capacity of 1000 tonnes per day and typically handles approximately 180,000 tonnes per year. Waste is hauled from this facility in large trailers to final disposal sites outside the Region.

6.5.2 Georgetown Transfer Station

The northern portion of the Region is served by this transfer station located on Armstrong Road near the intersection of Highway 7. This facility is owned and operated by Leferink Transfer Limited. This facility has a capacity of approximately 150 tonnes per day and handles in the order of 25,000 tonnes/year. Waste is hauled from this facility using open top trailers.

6.5.3 Container Stations

In addition to the two transfer stations, the Region maintains a container station in each of the area municipalities. These stations, restricted to small loads of residential waste, provide a number of services including:

- a drop-off point for bulky items such as white goods;
- a solid waste disposal container for use by rural residents who do not receive regular collection; and
- a depot for recyclables with separate bins for newspaper, glass and metal/plastics (PET).

6.5.4 Future EFW Facility

It was noted in Section 2.5 that Halton is considering the development of an energy-from-waste facility within the Region.

An estimate of the minimum amount of Halton waste to be disposed of by such a facility is shown in Table 6.2.

The Region is also evaluating supplementing this waste to achieve a nominal facility size requirement of up to 2,000 tonnes per day or greater by importing waste from outside the Region.

TABLE 6.2

Halton EFW Facility Sizing

Year	Waste to be Disposed of by Alternative Methods[1] (tonnes)	Typical EFW System[2] (TPD)	Typical Resource Recovery RDF System[3] (TPD)
1997	41,381	167	243
1998	42,488	171	249
1999	43,942	177	258
2000	44,479	179	261
2001	45,335	183	266
2002	46,209	186	271
2003	47,048	190	276
2004	47,932	193	281
2005	48,795	197	286
2006	49,661	200	291
2007	50,519	204	296
2008	51,315	207	301
2009	54,784	221	321
2010	55,492	224	325
2011	56,186	226	329
2012	56,879	229	333
2013	57,587	232	337
2014	58,309	235	342
2015	59,031	238	346

Notes: (1) "Waste to be disposed of by alternative methods" is the quantity of waste which has to be eliminated. Higher quantities of waste must be sent to a processing facility to allow for non-processibles, downtime and residues.

(2) EFW plant sizing assumes: operations 7 days/week, 85% of plant capacity achieved.

(3) RDF plant sizing assumes: operations 7 days/week, 85% of plant capacity achieved; 45% of waste is non-processible, 15% recycled, 40% RDF.

Source: Region of Halton

Mandate & Administrative Issues

7.0 MANDATE AND ADMINISTRATIVE ISSUES

When considering the potential for the centralized management of solid waste within the Greater Toronto Area (GTA), it is important to understand the mandate, responsibilities and structures of the various municipalities. These aspects are discussed under the broad headings of: Legal Mandate and Powers; and Administrative Structure.

7.1 Durham

Legal Mandate and Powers

The Regional Municipality of Durham has responsibility for waste disposal under Section 144 of the Regional Municipality of Durham Act.

Administrative Structure

The Regional Director of Operations, who reports to the Commissioner of Public Works, has responsibility for solid waste management.

The key managers reporting to Director of Operations include: the Plant Operations Manager, Waste Reduction Manager (a new position) and a Technical Support Manager. Supervisory and clerical staff at the transfer stations and rural landfill sites report through the Manager of Plant Operations while the operation of the Durham Recycling Centre will fall under the waste Reduction Manager.

7.2 York

Legal Mandate and Powers

The legal mandate and powers exercised by the Region of York in solid waste management flow from Section 169 of the Regional Municipality of York Act. Significant pertinent amendments were made in 1980. No further significant future amendments are being considered.

The Region of York provides solid waste disposal service. It does so primarily by way of an agreement with Metropolitan Toronto whereby Metro accepts solid waste originating in York at the Metro owned Keele Valley landfill. Within the Region of York the Townships of Georgina and King provide their own disposal facilities with the approval of the Region.

As discussed previously, several member municipalities in the Region of York have initiated recycling activities. The Region is assisting in these efforts and is proposing to provide a processing centre for diverted wastes.

The Region's involvement with industrial/commercial wastes includes only informal cooperation to provide disposal.

Administrative Structure

The Region of York activities in solid waste management are currently carried out by senior staff with other significant duties. There are plans to add such staff to, at least initially, administer the Region's recycling efforts.

7.3 Metro

Legal Mandate and Powers

The legal mandate and powers exercised by the Region of Metropolitan Toronto in solid waste management flow from Section 66 of the Municipality of Metropolitan Toronto Act.

Metro has formal control over the hauling and disposal of only that portion of the solid wastes collected by Metro member municipalities and that portion of waste generated by Metro agencies which are delivered to Metro facilities. This includes primarily only residential solid wastes. By custom, Metro has provided disposal facilities for industrial/commercial solid wastes.

Metro is seeking legislative changes to permit more effective solid waste management system control.

Several recent initiatives, as presented in Section 4.0, have been instituted by Metro including the following:

- Setting tipping fees at high enough levels to encourage generators to adopt 4 Rs.

- Encouraging member municipalities to expand recycling efforts by, for example, subsidising the cost overruns, after Provincial and other grants, for the blue box system for five years.

- Banning certain recyclable materials from Metro facilities.

- Establishing a pilot program for separated wet residential waste for composting by Metro at a central facility.

- Encouraged private interests and senior levels of government to promote diversion of wastes from landfill disposal.

- Implementing information systems on types and quantities of wastes to improve future effectiveness of solid waste management actions to divert materials and to increase uses and markets for diverted materials.

Administrative Structure

Metro's actions in solid waste management are carried out by a Division of the Works Department reporting to the Commissioner of Works. The Division administered an 1989 budget of some $73,000,000. It consists of administration, operations, services and planning elements. A significant segment of staff are involved in investigating, assisting, monitoring and initiating recycling activities by member municipalities, Metro and the private sector.

7.4 Peel

Legal Mandate and Powers

Section 132 of the Regional Municipality of Peel Act makes the Region responsible "for the provision of facilities for receiving, dumping and disposal of solid wastes and such other wastes as may be designated by by-law of the Regional Council and no area municipality shall provide such facilities".

The Region currently has no authority to control or direct private sector wastes other than through the fees charged at its disposal facilities.

The Region is currently proposing to amend this legislation to obtain more control over wastes. Two of the key proposed amendments are as follows:

"Region's Power to Exclude Non-Peel Waste

(3) On and after the day this Section comes into force, no facilities for the receiving, dumping and disposing of waste shall be provided in the Regional Area by any person without the consent of the Regional Council, which consent may be given upon such terms and conditions, including the payment of such compensation, as may be agreed upon.

Regional Powers to Direct Waste

(14) The Regional Corporation may, in respect of any waste collected in the Regional Area or brought to the Regional Area for the purpose of receiving, dumping, treatment or disposal or for the recovery of materials or energy therefrom, by by-law, authorize the Regional Commissioner of Public Works, or his delegate, to require any person who generates, collects or transports such waste or who causes such waste to be generated, collected or transported, to direct or deliver such waste to such waste facility located within or outside of the Regional Area as the Commissioner may determine."

Administrative Structure

Reporting to the Commissioner of Public Works, the Director of Waste Management has responsibility for solid waste management activities. The key staff members reporting to the Director include:

- Engineer Landfill Operations
- Engineer Development and Abatement
- Manager Waste Reduction and Recovery Programs
- Manager Master Plan Policy and Promotion
- Manager Water Pollution and Control.

7.5 Halton

Legal Mandate and Powers

The Region, under Section 131 of the Regional Municipality of Halton Act, has the statutory authority to provide waste disposal services for municipal and private waste. No area municipality within the Region is permitted to provide such services. On the other hand, the municipalities within the Region are not necessarily obligated to avail themselves of the services provided by the Region. The private sector has no obligation or requirement to use any particular disposal facility.

The Region is providing the collection of recyclable materials in three of the area municipalities under agreement with the municipalities. Halton provides funds to the fourth municipality to collect recyclables which are sent to the Region's recycling centre for processing. Halton's recycling programs are monitored by a joint Region - Area Municipality Separation at Source Committee.

Administrative Structure

Solid waste management is the responsibility of the Director of Waste Management who reports to the Commissioner of Public Works. There are four

key managers with staff members reporting to the Director. These positions are:

- Manager Waste Reduction
- Waste Disposal Engineer
- Manager Industrial Waste and Sludge
- Environmental Approvals Coordinator

Appendix A

APPENDIX A

GLOSSARY

3 Rs

Diversion of materials from landfill and incineration by Reduction, Reuse and Recycling.

4 Rs

Diversion of materials from landfill by Reduction, Reuse, Recycling and Recovery. The fourth "R" can be interpreted to include the recovery of energy via incineration.

Blue Box

A container for collecting source separated recyclable materials in homes. The "blue box", containing recyclable materials such as cans and glass containers, is placed at curbside for collection.

Candidate Area

An area that may be suitable for siting a waste management facility.

Candidate Site

A site that may be suitable for siting a waste management facility. (Note: an area is generally larger than a site. Areas are generally refined into sites through site specific investigations.)

Co-mingled

Mixed recyclable materials that may be stored or transported in a single compartment or bin.

Compost

A mixture of natural fertilizing and soil conditioning agents produced by the aerobic action of bacteria and other micro organisms or organic matter.

Diversion Credit

Fees paid for diverting materials from disposal facilities, such as landfills, by reusing or recycling them.

EA

See Environmental Assessment

EAA

The Environmental Assessment Act, R.S.O. 1980 Chapter 140 as amended.

EFW

See Energy-From-Waste

Energy-From-Waste

The production of energy, generally in the form of steam or subsequently electricity, through the incineration (burning) of solid waste.

Environmental Assessment

A process of investigating and evaluating an undertaking that is in keeping with the requirements of the Environmental Assessment Act of the Province of Ontario. The process involves examining both the "alternatives to" an undertaking as well as "alternative methods" of carrying out the undertaking.

Generation Rate

The rate at which solid waste is produced. It may be expressed as a function of population (i.e., tonnes per capita), employment (i.e., tonnes per employee), or other planning variable (e.g., tonne per ha of industrial land).

GTA

The Greater Toronto Area which includes the Regional Municipalities of Durham, York, Peel, Halton and Metropolitan Toronto.

Landfill Site

A controlled facility in which solid waste is buried in a planned manner to minimize nuisance and hazard to the public.

Master Plan

A comprehensive plan for the management of solid wastes.

Material Ban

A ban placed on disposing of a material at facilities such as landfill sites in order to encourage the recycling of the material.

Multi-Material

More than one material. Generally used to describe a recycling program where several materials, such as new glass and metals are recycled.

PET

A plastic bottle often used as a soft drink container. The technical name of the plastic used is Polyethylene Terephthalate.

Recycling

The use of a discarded material as a material in the manufacture of a new product or material.

Recycling Centre

A facility for receiving, sorting and processing recyclable materials.

Resource Recovery Facility

A facility for the production of energy-from-waste (see energy-from-waste).

Solid Waste

Non-hazardous material in solid form discarded by our society.

Source Separation

The separation of reusable and recyclable materials from the waste stream at the point of waste generation.

SWEAP

Metropolitan Toronto Solid Waste Environmental Assessment Plan

SWISC

Solid Waste Interim Steering Committee

Tipping Fee

An amount of money charged for the disposal of solid wastes at a facility such as a landfill site.

Transfer Station

A facility for receiving, bulking and loading solid wastes. Generally smaller vehicles deliver wastes to a transfer station where it is reloaded on larger transfer vehicles for haul to remote disposal facilities.

Waste Management System

An overall system for the management of solid wastes including: generation, storage collection/haul, processing and disposal.

Wet Dry

A waste management approach, developed in Europe, whereby solid waste is divided at source into two streams, one wet and one dry. The materials from the wet and dry containers are collected separately and processed. The dry stream is sorted for recyclable materials and the wet stream is composted.

Appendix B

APPENDIX B

List of Publications and Reports

Durham

- Work Program for Solid Waste Management Plan, Regional Municipality of Durham, December 1988.
- Waste Management Study - Update Report, The Regional Municipality of Durham, July 1988.
- Waste Management Study - Final Report, The Regional Municipality of Durham, May 1985.

York

- Waste Management Study, Regional Municipality of York, May 1989.

Metro

- Solid Waste Environmental Assessment Plan Solid Waste Management System Inventory, Base Year 1986 (Discussion Paper No.4.1), February 1988.
- Metropolitan Works Department Refuse Disposal Division Annual Report, 1988.
- Status Report from the Deputy Commissioner of Works to the Metropolitan Works Committee on the Solid Waste Environmental Assessment Plan, February 1, 1989.
- Report from the Commissioner of Works to the Metropolitan Works Committee on the Waste Reduction and Recycling Plan, December 6, 1988.
- Minutes of the Works Committee, December 16, 1988, as prepared by the Metropolitan Toronto Clerks Department.
- Solid Waste Environmental Assessment Plan Information Package, 1989.
- A Regulatory Agenda for Solid Waste Reduction, June 1989.

Peel

- Draft Solid Waste Management Policy Statement and Master Plan, The Regional Municipality of Peel, 1988.
- Waste Management Master Plan Update for the Regional Municipality of Peel - Stage 3 Final Report, August 1988.

- Waste Management Master Plan Update for the Regional Municipality of Peel - Stage 3 Preliminary Report, December 1986.

- Waste Management Master Plan Update for the Regional Municipality of Peel - Stage 2 Final Report, March 1986.

- Waste Management Master Plan Update for the Regional Municipality of Peel - Stage 2 Preliminary Report, January 1985.

- Waste Management Master Plan Update for the Regional Municipality of Peel - Stage 1 Final Report, April 1984.

Halton

- The Joint Board - The Consolidated Hearings Act, 1981. Reasons for Decision and Decision.

  In the matter of an application by the Regional Municipality of Halton for:

  a) the acquisition of land for the construction, operation and maintenance of a sanitary landfill site to contain 7.96 million cubic metres of waste in the Regional Municipality of Halton by one of two alternative methods as follows:

     (i) landfilling at the site referred to in Halton's Environmental Assessment as Site F in the City of Burlington;

     (ii) landfilling at the site commonly referred to in Halton's Environmental Assessment as Site D in the Town of Milton.

- EPA Review of Waste Quantity Projections, Regional Municipality of Halton, 1986.

- Facts on .. Halton's Waste Management System, October 1988.